WHAT IS CLAIMED IS:

1. A magnetoresistance effect element, comprising:

a nonmagnetic spacer layer,

first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer having a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the second ferromagnetic layer comprising first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically so that their magnetizations are aligned and remain antiparallel with one another in the presence of a magnetic field signal, the magnetization of the first ferromagnetic layer being freely rotatable in response to the magnetic field signal; and

a nonmagnetic high-conductivity layer disposed in contact with the first ferromagnetic layer so that the first ferromagnetic layer is disposed between the nonmagnetic spacer layer and the nonmagnetic high-conductivity layer.

2. The magnetoresistance effect element of claim 1, wherein the first ferromagnetic layer has a film thickness between 0.5 nanometers and 4.5 nanometers.

3. The magnetoresistance effect element of claim 1, wherein the first ferromagnetic layer has a film thickness between a mean free path for conduction electrons having spin antiparallel to the magnetization direction of the first ferromagnetic layer and a mean free path for conduction electrons having spin parallel to the magnetization direction of the first ferromagnetic layer.

4. The magnetoresistance effect element of claim 1, wherein the nonmagnetic high-conductivity layer and the second ferromagnetic layer have a film thickness so that wave asymmetry, (V1-V2)/(V1+V2), is in the range of negative 0.1 and positive 0.1, in which V1 is the peak value of reproduction output in a positive magnetic field signal and V2 is the peak value of reproduction output in a negative magnetic field signal.

5. The magnetoresistance effect element of claim 1, wherein the first ferromagnetic layer responses to a magnetic field Hin of interlayer coupling between the first and second ferromagnetic layers, a stray magnetic field Hpin of second ferromagnetic layer, and a current magnetic field Hcu of electric current applied to the first ferromagnetic layer, and sum of Hpin, Hin, and Hcu is substantially zero in center of film thickness of the first ferromagnetic layer.

6. The magnetoresistance effect element of claim 1, wherein the second ferromagnetic film is disposed adjacent to the

nonmagnetic spacer layer via the first ferromagnetic film, the nonmagnetic high-conductivity layer has a film thickness t (HCL) in terms of copper (Cu) layer of specific resistance 10 microohm centimeter,

the first and second ferromagnetic films have a magnetic film thickness tm (pin1) and tm (pin2), respectively, in terms of saturation magnetization of 1 Tesla, and

t (HCL), tm (pin1) and tm (pin2) satisfy conditions of 0.5 nanometers $\leq$ tm (pin1) - tm (pin2) + t (HCL) $\leq$ 4 nanometers and t (HCL) $\geq$ 0.5 nanometers.

7. The magnetoresistance effect element of claim 1, wherein the nonmagnetic high-conductivity layer is formed of a material having a bulk resistivity at room temperature not larger than 10 microohm centimeter.

8. The magnetoresistance effect element of claim 1, wherein the nonmagnetic high-conductivity layer is formed of a material having a resistivity so that a substantially large number of majority carriers having a spin parallel to the magnetization direction of the first ferromagnetic layer exist in the nonmagnetic high-conductivity layer.

9. The magnetoresistance effect element of claim 1, wherein the nonmagnetic high-conductivity layer contains a metal element selected from the group consisting of copper (Cu), gold (Au), silver (Ag), ruthenium (Ru), iridium (Ir), rhenium (Re), rhodium(Rh), platinum (Pt), palladium (Pd), aluminium (Al),

osmium (Os), and nickel (Ni).

10. The magnetoresistance effect element of claim 1, wherein the nonmagnetic high-conductivity layer comprises a first nonmagnetic high-conductivity film disposed in contact with the first ferromagnetic layer and a second nonmagnetic high-conductivity film disposed in contact with the first nonmagnetic high-conductivity film so that the first nonmagnetic high-conductivity film is disposed between the first ferromagnetic layer and the second nonmagnetic high-conductivity film.

11. The magnetoresistance effect element of claim 10, wherein the first nonmagnetic high-conductivity film contains copper (Cu).

12. The magnetoresistance effect element of claim 10, wherein the second nonmagnetic high-conductivity layer contains an element selected from the group consisting of ruthenium (Ru), rhenium (Re), rhodium (Rh), palladium (Pd), platinum (Pt), iridium (Ir), and osmium (Os).

13. The magnetoresistance effect element of claim 10, further comprising a layer disposed in contact with the second nonmagnetic high-conductivity film so as to sandwich the second nonmagnetic high-conductivity film with the first nonmagnetic high-conductivity film and containing an element selected from the group consisting of chromium (Cr), tantalum (Ta), titanium (Ti), zirconium (Zr), tungsten (W), hafnium (Hf), and

molybdenum (Mo).

14. The magnetoresistance effect element of claim 1, further comprising a layer disposed in contact with the nonmagnetic high-conductivity film so as to sandwich the nonmagnetic high-conductivity film with the first ferromagnetic and containing an element selected from the group consisting of chromium (Cr), tantalum (Ta), titanium (Ti), zirconium (Zr), tungsten (W), hafnium (Hf), and molybdenum (Mo).

15. The magnetoresistance effect element of claim 1, wherein the first ferromagnetic layer includes a laminate film, and the laminate film comprises a layer containing nickel iron (NiFe) alloy and a layer containing cobalt (Co).

16. The magnetoresistance effect element of claim 1, wherein the first ferromagnetic layer contains cobalt iron (CoFe) alloy.

17. The magnetoresistance effect element of claim 1, wherein the nonmagnetic spacer layer contains copper (Cu) and the nonmagnetic spacer layer has a film thickness between 1.5 nanometers and 2.5 nanometers.

18. The magnetoresistance effect element of claim 1, wherein one of the first and second ferromagnetic films disposed adjacent to the nonmagnetic spacer layer has a film thickness equal to or thicker than another one of the first and second ferromagnetic films, and a difference in magnetic thickness between the first and second ferromagnetic films falls between

0 nanometers Tesla and 3 nanometers Tesla.

19. The magnetoresistance effect element of claim 1, wherein the antiferromagnetically coupling film contains ruthenium (Ru) and the coupling film has a film thickness between 0.8 nanometers and 1.2 nanometers.

20. The magnetoresistance effect element of claim 1, further comprising an antiferromagnetic layer disposed in contact with and magnetically exchange coupled with one of the first and the second ferromagnetic films for fixing the magnetization of said one of the first and the second ferromagnetic films, the antiferromagnetic layer containing X_zMn_{1-z} in which X is an element selected from the group consisting of iridium (Ir), ruthenium (Ru), rhodium (Rh), platinum (Pt), palladium (Pd) and rhenium (Re) and the compositional factor z falls between 5 atomic % and 40 atomic %.

21. The magnetoresistance effect element of claim 1, further comprising an antiferromagnetic layer disposed in contact with and magnetically exchange coupled with one of the first and the second ferromagnetic films for fixing the magnetization of the one of the first and the second ferromagnetic films, the antiferromagnetic layer containing X_zMn_{1-z} in which X is an element selected from the group consisting of platinum (Pt) and palladium (Pd) and compositional factor z falls between 40 atomic % and 65 atomic %.

22. A magnetoresistance effect element, comprising:

a nonmagnetic spacer layer,

first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer having a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in response to a magnetic field signal; and

a nonmagnetic high-conductivity layer disposed in contact with the first ferromagnetic layer so that the first ferromagnetic layer is disposed between the nonmagnetic spacer layer and the nonmagnetic high-conductivity layer, wherein

the nonmagnetic high-conductivity layer and the second ferromagnetic layer have a respective film thickness so that wave asymmetry, (V1-V2)/(V1+V2), is in the range of negative 0.1 and positive 0.1, in which V1 is the peak value of reproduction output in a positive magnetic field signal and V2 is the peak value of reproduction output in a negative magnetic field signal.

23. The magnetoresistance effect element of claim 22, wherein the first ferromagnetic layer has a film thickness between 0.5 nanometers and 4.5 nanometers.

24. The magnetoresistance effect element of claim 22, wherein the nonmagnetic high-conductivity layer has a film thickness t (HCL) in terms of copper (Cu) layer of specific resistance

10 microohm centimeter, the second ferromagnetic layer has a magnetic film thickness tm (pin1) in terms of saturation magnetization of 1Tand the t (HCL) and tm (pin1) satisfy conditions of 0.5 nanometers $\le$tm (pin1)+t (HCL)$\le$4 nanometers and t (HCL)$\ge$0.5 nanometers.

25. The magnetoresistance effect element of claim 22, wherein the second ferromagnetic film is disposed adjacent to the nonmagnetic spacer layer via the first ferromagnetic film,

the second ferromagnetic layer comprises first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically,

the nonmagnetic high-conductivity layer has a film thickness t (HCL) in terms of copper (Cu) layer of specific resistance 10 microohm centimeter,

the first and the second ferromagnetic films have a magnetic film thickness tm(pin1) and tm(pin2), respectively, in terms of saturation magnetization of 1 Tesla and,

t (HCL), tm (pin1), and tm (pin2) satisfy conditions of 0.5 nanometers $\le$tm (pin1) - tm (pin2)+t (HCL)$\le$4 nanometers and t (HCL)$\ge$0.5 nanometers.

26. A magnetoresistance effect element, comprising:

a nonmagnetic spacer layer,

first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer has a magnetization direction of the first ferromagnetic layer at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in a magnetic field signal; and

a nonmagnetic high-conductivity layer disposed in contact with the first ferromagnetic layer so that the first ferromagnetic layer is disposed between the nonmagnetic spacer layer and the nonmagnetic high-conductivity layer, wherein

the nonmagnetic high-conductivity layer has a film thickness t (HCL) in terms of Cu layer of specific resistance 10 microohm centimeter, the pair of ferromagnetic films have a magnetic film thickness tm (pin1) in terms of saturation magnetization of 1 Tesla and t (HCL) and tm (pin1) satisfy conditions of 0.5 nanometers $\leq$tm (pin1)+t (HCL)$\leq$4 nanometers and t(HCL)$\geq$0.5 nanometers.

27. The magnetoresistance effect element of claim 26, wherein the nonmagnetic high-conductivity layer contains a metal element selected from the group consisting of copper (Cu), gold (Au), silver (Ag), ruthenium (Ru), iridium (Ir), rhenium (Re), rhodium (Rh), platinum (Pt), palladium (Pd), aluminium (Al), osmium (Os), and nickel (Ni).

28. A magnetoresistance effect element, comprising:

a nonmagnetic spacer layer,

first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer has a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the second ferromagnetic layer comprising first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically so that their magnetizations are aligned antiparallel with one another and remain antiparallel in the presence of an applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in signal magnetic field; and

an antiferromagnetic layer disposed in contact and exchange coupled with one of the ferromagnetic films, a closed packed plane of the antiferromagnetic layer being oriented so that a half-value width of the diffraction peak from the close-packed plane of the antiferromagnetic layer in its rocking curve is 8 or less.

29. A magnetoresistance effect element, comprising:

a magnetoresistance effect film, having a nonmagnetic spacer layer, and

first and second ferromagnetic layer separated by the nonmagnetic spacer layer, a magnetization direction of the first ferromagnetic layer being at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the second ferromagnetic layer comprising first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically so that their magnetizations are aligned antiparallel with one another and remain antiparallel in the presence of an applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in signal magnetic field;

a pair of electrodes coupled to the magnetoresistance effect film and having respective inner edges; and

a pair of longitudinal biasing layers for providing bias magnetic fields to the first ferromagnetic layer in parallel with a longitudinal direction of the first ferromagnetic layer and having respective inner edges, wherein the inner edges of the pair of electrodes are disposed between the inner edges of the pair of longitudinal biasing layers.

30. A magnetoresistance effect element, comprising:

a nonmagnetic spacer lay r;

first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer having a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in a magnetic field signal,

a magnetoresistance effect-improving layer comprising a plurality of metal films and disposed in contact with the first ferromagnetic layer so that the first ferromagnetic layer is disposed between the nonmagnetic spacer layer and the magnetoresistance effect -improving layer, one of the plurality of metal films disposed in contact with the first ferromagnetic layer contains metal element of not solid solution with metal element of the first ferromagnetic layer; and

a nonmagnetic underlayer or a nonmagnetic protecting layer disposed in contact with the magnetoresistance effect-improving layer so that the magnetoresistance effect-improving layer is disposed between the first ferromagnetic layer and the nonmagnetic underlayer or the nonmagnetic protecting layer.

31. A magnetoresistance effect head, comprising

a magnetoresistance effect element having a nonmagnetic spacer layer,

first and second ferromagnetic layer separated by the

nonmagnetic spacer layer, the first ferromagnetic layer having a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the second ferromagnetic layer comprising first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically so that their magnetizations are aligned antiparallel with one another and remain antiparallel in the presence of an applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in a magnetic field signal; and

a nonmagnetic high-conductivity layer disposed in contact with the first ferromagnetic layer so that the first ferromagnetic layer is disposed between the nonmagnetic high-conductivity layer and the nonmagnetic spacer layer

32. The magnetoresistance effect head of claim 31, further comprising upper and lower magnetic shields sandwiching the magnetoresistance effect element through respective one of upper and lower magnetic gaps, wherein an average surface roughness of an upper surface of the lower magnetic gap is smaller than thickness of the antiferromagnetically coupling film.

33. The magnetoresistance effect head of claim 31, wherein the distance between a center of film thickness of the first ferromagnetic film and one of the pair of magnetic shields through the nonmagnetic high-conductivity layer is equal or smaller than a distance between the center of film thickness and another one of the pair of magnetic shields through the second ferromagnetic film.

34. A magnetic recording and reproducing head, comprising a magnetoresistance effect element having a nonmagnetic spacer layer,

first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer has a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the second ferromagnetic layer comprising first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically so that their magnetizations are aligned antiparallel with one another and remain antiparallel in the presence of an applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in a magnetic field signal; and

a nonmagnetic high-conductivity layer disposed in contact with the first ferromagnetic layer so that the first ferromagnetic layer is disposed between the nonmagnetic spacer layer and the nonmagnetic high-conductivity layer; and

a magnetic recording head comprising a magnetic pole and a coil for providing said magnetic field signal to the magnetic pole.

35. A magnetic head assembly, comprising

a magnetoresistance effect head including a nonmagnetic spacer layer, and first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer having a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the second ferromagnetic layer comprising first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically so that their magnetizations are aligned antiparallel with one another and remain antiparallel in the presence of an applied magnetic field, the magnetization of the first ferromagnetic layer freely rotating in a magnetic field signal, and the magnetoresistance effect head also including a nonmagnetic high-conductivity layer disposed in contact with the first ferromagnetic layer so that the first

ferromagnetic layer is disposed between the first ferromagnetic layer and the nonmagnetic high-conductivity layer; and

an suspension arm holding the magnetoresistance effect head.

36. A hard disk drive system, comprising

a magnetic medium, and

a magnetic head assembly, comprising

a magnetoresistance effect head for reproducing magnetic signal field from the magnetic medium, having a nonmagnetic spacer layer,

first and second ferromagnetic layers separated by the nonmagnetic spacer layer, the first ferromagnetic layer having a magnetization direction at an angle relative to a magnetization direction of the second ferromagnetic layer at zero applied magnetic field, the second ferromagnetic layer comprising first and second ferromagnetic films antiferromagnetically coupled to one another and an antiferromagnetically coupling film located between and in contact with the first and second ferromagnetic films for coupling the first and second ferromagnetic films together antiferromagnetically so that their magnetizations are aligned antiparallel with one another and remain antiparallel in the presence of an applied magnetic field, the magnetization of the first ferromagnetic layer freely rotate in a magnetic field signal, and the magnetoresistance effect head also

including a nonmagnetic high-conductivity layer disposed in contact with the first ferromagnetic layer so that the first ferromagnetic layer is disposed between the nonmagnetic spacer layer and the nonmagnetic high-conductivity layer; and

a suspension arm holding the magnetoresistance effect head so that the magnetoresistance effect head is disposed on or above the magnetic medium.